# 第３講　難関私立大英語長文③

**ポイント**

【1】数量詞の名詞用法
【2】呼応
【3】不定詞の主語

次の英文を読んで，問に答えなさい。

The radiation from the sun heats the surface of the Earth, which (ア) in turn heats the air above it, causing it to rise. Air above a warm part of the planet will rise faster than the surrounding cooler air, so more air slides in (イ) to take its place in the low-pressure void left behind. So wind is born. And (1) that is the heart of the weather machine: heat and pressure differences bring cyclones, depressions, thunderstorms and hurricanes, all blown across the surface of the globe by the wind.

But if wind is the engine of the weather, water is the fuel. Our weather (ウ) consists of a constant interplay of water as vapor, liquid and solid ice. Like the formation process of rain, snow and storm, (2) so much depends on water molecules changing from one state to the other that it is not surprising to find that our planet lies at precisely the right distance from the sun for water to exist in all three states at the same time. Alone among the planets of the solar system, Earth has average temperature and pressure that are very close to what scientists call the ‘triple point’ of water — the combination of temperature and pressure at which water can exist in all three of its physical states. (3) This property of our planet is one which allows us to exist.

*NOTE*

Warm air, dry air, cold air and wet air all behave in different ways, and it is those qualities of air that make it move and drive the engine of the weather. Although it may not seem obvious, moist air is less dense than dry air, and so will always tend to rise above it. This is because of a very simple piece of physics. A water molecule is made up of one oxygen atom and two hydrogen atoms（$H_2O$）. Because hydrogen atoms are the smallest and lightest atoms that exist, a molecule of $H_2O$ is much lighter than a molecule of either oxygen（$O_2$）or nitrogen（$N_2$）, which are what dry air consists of. In moist air, water-vapor molecules have replaced some of the oxygen or nitrogen molecules, one for one, so any given volume of moist air contains more lightweight molecules than does the same volume of dry air, and therefore it is lighter and less dense.

*NOTE*

Warm air is less dense than cold air because, when they are warm, all air molecules are more active, move around more and take up more space — the air expands. Thus a given volume of warm air will simply contain fewer molecules than that of cold air, so it will be less dense.

In short, if there is warm, moist air it is going to move up and, at its very simplest, all of our various forms of weather have that single action at their heart: the air rises, in comes the wind below; as the air rises further it cools, the water vapor condenses to cloud and down comes the rain. That's all there is to it.

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A. 本文中の下線部（ア〜ウ）の文中での意味に最も近いものを，それぞれ下記（a 〜 d）の中から一つ選びなさい。

（ア）in turn

a. orderly　b. smoothly　c. then　d. hardly

（イ）to take its place

a. to expand the place　b. to empty the place

c. to influence the place　d. to occupy the place

（ウ）consists of

a. is condensed into　　b. is composed of

c. is proved to be　　d. is transformed to

B. 本文中の二重下線部（1,3）の文中での意味に最も近いものを, それぞれ下記（a ～ d）の中から一つ選びなさい。二重下線部（2）は，日本語に訳しなさい。

（1）that is the heart of the weather machine

a. that is the major influence of the sun on the weather

b. that is the essential place where a variety of weather is observed

c. that is the central mechanism that produces a variety of weather

d. that is the major reason why weather makes us feel strong emotions

（3）This property of our planet

a. The property of Earth that its distance from the sun makes it full of life

b. The property of Earth that it surprises us to find that water changes its states

c. The property of Earth that its temperature and pressure allow human beings to exist in this world

d. The property of Earth that its temperature and pressure allow water to exist in all three of its physical states

C. 次の問い（1 ～ 3）の答えとして最も適当なものを，それぞれ下記（a ～ d）の中から一つ選びなさい。

(1) What does the author compare water to?

a. The author compares it to the weather.

b. The author compares it to the engine fuel.

c. The author compares it to the weight of air.

d. The author compares it to the hydrogen and oxygen.

(2) Why does moist air tend to rise above dry air?

a. Because moist air is warmer than dry air.

b. Because molecules of dry air are less dense than those of moist air.

c. Because moist air contains more lightweight molecules than dry air.

d. Because molecules of moist air are more active and move around more than those of dry air.

(3) Why does the author end the passage with “That’s all there is to it”?

a. Because he would like to clarify that heat and pressure differences prevent hurricanes.

b. Because he would like to point out that the rising air makes it rain.

c. Because he would like to point to the inefficiency of the weather machine.

d. Because he would like to emphasize the simplicity of the process by which various forms of weather take place.

## 復習テスト　第３講

＊次の見出し語（句・文）に合う選択肢を選びなさい。

1. 放射線

① revoke　② retention　③ radiation　④ reinforcement

2. 燃料

① feminine　② fluid　③ federal　④ fuel

3. ～から成る

① communicate with　② consist of

③ consist in　④ coincidence with

4. 粒子

① moment　② melancholy　③ mentality　④ molecule

5. 温度

① trivial　② tremendous　③ telepathy　④ temperature

6. 特質

① property　② penalty　③ pinpoint　④ period

7. 原子

① admire　② adorn　③ atom　④ admit

8. 湿った

① liquid　② solid　③ wicked　④ moist

9. 濃い

① dent　② doom　③ deed　④ dense

# 第３講　解答

＜解答＞

A.（ア）c　（イ）d　（ウ）b

B.（1）c　（3）d　（2）全訳の二重下線部を参照。

C.（1）b　（2）c　（3）d

＜全訳＞

太陽からの放射線は，地球の表面を暖め，それが次にその上の空気を暖め，そのせいで地球の温度が上昇する。地球の暖かい部分の上の空気は，周囲のより涼しい空気より速く上昇するので，後に気圧の低い空いたスペースが残され，そこにより多くの空気が流れ込み，場所を占める。そこで，風が生まれる。そしてそれが，天気の仕組みの本質だ。熱と気圧の違いが，サイクロンや低気圧，雷雨，ハリケーンを生み出し，全てが風によって地球の表面をくまなく吹き荒れる。

しかし，もし風が天気のエンジンなら，水は燃料だ。私たちの天気は，蒸気，液体，固体の氷としての水の絶え間ない相互作用から成る。雨，雪，嵐の形成される過程のように，非常に多くが，一つの状態から別の状態へと変化する水の分子次第なので，水が同時に三つ全ての状態で存在するのに，太陽からの距離がちょうど適切なところに地球があるとわかっても驚きではない。太陽系の惑星で唯一地球は，科学者が言う水の「三重点」にとても近い平均気温や気圧を有している。すなわち，水が三つ全ての物理的状態で存在できる温度や気圧の組み合わせを有しているのである。地球のこの特質のおかげで，私たちは生存できるのだ。

暖かい空気，乾燥した空気，冷たい空気，そして湿った空気，全てが異なる方法で機能して，空気を動かし天気のエンジンを操縦するのは，空気のそうした性質だ。明らかとは思えないかもしれないが，湿った空気は，乾いた空気ほどの密度がないので，常に乾いた空気よりも上に上昇する傾向にあるだろう。これはとても単純な物理学の一要素が原因だ。水の分子は，一つの酸素原子と二つの水素原子から成る（$H_2O$）。水素原子は存在するうちで最も小さく，最も軽い原子なので，水の分子は，乾燥した空気を構成する，酸素（$O_2$）や窒素（$N_2$）の分子のどちらよりもずっと軽い。湿った空気では，水蒸気の分子が，一対一で，酸素や窒素の分子の一部と置き換わっているので，一定体積の湿った空気は常に同体積の乾燥した空気よりも，多くの軽い分子を含む。それゆえ，それはより軽く，より密度が小さい。

暖かい空気が冷たい空気より密度が小さいのは，その空気が暖かいとき，全ての空気の分子がより活発で，より動き回り，より多くの空間を占める，すなわち，その空気が膨張することが理由だ。それゆえ，一定量の暖かい空気は，一定量の冷たい空気よりも単純に含む分子が少ないので，それはよりより密度が小さくなるだろう。

すなわち，もし暖かく湿った空気があるなら，それは上に向かうことになり，最も単純に言うと，私たちの多様な天気の形態の全てが，基本的には単一の行動しかしない。すなわち，空気が上昇し，その下に風が吹き込んでくるのだ。空気がさらに上昇すると，冷え込み，水蒸気は凝結して雲になり，雨となって降ってくる。ただそれだけのことだ。

## 第３講　重要語彙リスト　　＊一つ一つ何度も繰り返して，覚えてください

| | | |
|---|---|---|
| 1 | radiation | 放射線 |
| 2 | surface | 表面 |
| 3 | in turn | 次に |
| 4 | slide | 滑る |
| 5 | take one's place | ～の位置を占める |
| 6 | void | 空間，空所 |
| 7 | leave O behind | O を後に残す |
| 8 | fuel | 燃料 |
| 9 | consist of | ～から成る |
| 10 | constant | 絶え間ない |
| 11 | interplay | 相互作用 |
| 12 | vapor | 蒸気 |
| 13 | formation | 形成 |
| 14 | molecule | 粒子，分子 |
| 15 | combination | 結合，組み合わせ |
| 16 | physical | 物理的な |
| 17 | property | 特質 |
| 18 | obvious | 明らかな |
| 19 | moist | 湿った |
| 20 | dense | 濃い，密度が大きい |
| 21 | be made up of | ～から成る |
| 22 | oxygen | 酸素 |
| 23 | atom | 原子 |
| 24 | hydrogen | 水素 |
| 25 | nitrogen | 窒素 |
| 26 | replace | 取って代わる |
| 27 | contain | 含む |
| 28 | take up | 占める |
| 29 | expand | 広がる，膨張する |
| 30 | given | 一定の |
| 31 | in short | すなわち |
| 32 | at one's heart | 基本的には |
| 33 | condense | 凝縮する |

## 第３講　音読用白文　①　②　③　④　⑤　⑥　⑦　⑧　⑨　⑩

The radiation from the sun heats the surface of the Earth, which in turn heats the air above it, causing it to rise. Air above a warm part of the planet will rise faster than the surrounding cooler air, so more air slides in to take its place in the low-pressure void left behind. So wind is born. And that is the heart of the weather machine: heat and pressure differences bring cyclones, depressions, thunderstorms and hurricanes, all blown across the surface of the globe by the wind.

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# 復習テスト　解答

＜第 3 講＞

1. ③　2. ④　3. ②　4. ④　5. ④

6. ①　7. ③　8. ④　9. ④